

# IO - October 2009

Issue 2009-10  
Eugene Astronomical Society

Eugene Astronomical Society  
Annual Club Dues \$25  
President: Sam Pitts - 688-7330  
Secretary: Jerry Oltion - 343-4758  
Additional Board members:  
Jacob Strandlien, Tony Dandurand.

[www.eugeneastro.org](http://www.eugeneastro.org)

EAS is a proud member of:

**The Astronomical League**  
The World's Largest Federation of Amateur Astronomers



## Next Meeting: Thursday, October 22nd

### Comparing the Brightness of Stars

#### Magnitudes: the Concept, History, and Applications to Astrophysics.

by Rick Kang

At our October meeting Rick Kang will discuss the concept of comparing values of objects, the history of the stellar magnitude system developed to compare brightness of stars, and then touch on some of the major astrophysical applications of apparent and absolute magnitudes. Rick will also explore the associated idea of luminosity used to measure stellar and galactic distances plus determine other physical characteristics of distant objects. He will also briefly discuss monitoring variable stars, a popular project where amateur astronomers can contribute astrophysical data very useful to the professional community.

In addition to Rick's talk, we will also have our annual elections for the Board of Directors. Sam Pitts, Tony Dandurand, and Jacob Strandlien are up for re-election. There is also one vacant board position. If you're interested in serving our club on the board of directors, contact Sam, Tony, Jacob, or Jerry, or just toss your hat into the ring at our October meeting.

After the elections and Rick's talk, Jacob Strandlien will present the astronomy news for the month. And as always, we encourage the sharing of astronomy-related questions, news, or projects with other members of the club.

## Next First Quarter Friday: October 23rd

Our next First Quarter Friday star party will be October 23rd. These star parties are laid-back opportunities to do some observing and promote astronomy at the same time. Mark your calendar and bring your scope to the College Hill Reservoir (24th and Lawrence in Eugene) and share the view with whoever shows up. Here are the dates for First Quarter Fridays through December of 2009.

October 23, 2009  
November 27, 2009

December 25, 2009 (Yes, Christmas night!)

# September Meeting Report

Our September 24th meeting was supposed to be upstairs, but a last-minute scheduling change at EWEB let us have the room beside our usual room instead. That was a much nicer venue for Mel Bartels's talk about his trip to Asia to view the longest eclipse of the 21st century last July. Mel had a great slide show of the many cultural sites that he and his wife, Barbara, visited, including the Great Wall of China and the Japanese city of Hiroshima.

The main action of the trip, however, happened on board a cruise ship near the island of Iwo Jima, where the weather was clear and the eclipse was at its longest duration. The ship was full of astronomers, all staking out their territory on the upper deck hours ahead of time. Mel's photos showed a crowd thicker than at any of our star parties, and each person there had a telescope or a camera pointed straight up.

We watched the entire eclipse twice through, thanks to two different movies of the event, and we had a lively discussion afterward. Many thanks to Mel for such a great program!

# September Star Party Report

Our First Quarter Friday on September 25th was a great success. We had clear sky, about a dozen scopes, and 75-100 interested people to look through them. Jupiter put on a fine show with two moons going into eclipse and one reemerging while the party was still in full swing.

The very next night we held a star party at the Cottage Grove Library as part of their Visions of the Universe program. We had about 10 telescopes and another 75-100 people there. Jupiter put on a shadow transit of Io for us, but the seeing through the downtown heat island wasn't good enough to let us spot the shadow for more than brief glimpses. People definitely enjoyed the view of the planet and its other moons, however, and of the many other objects we showed them.

## The Eugene Astronomical Society meets at EWEB

500 E. 4th Avenue in Eugene.

Our next meeting will be on Thursday, October 22nd, at 7:00 in the north building's Community Room. This is the first room in the semicircular building to the north of the fountain at EWEB's main campus on the east end of 4th Avenue.

**Meeting dates for 2009:** (All meetings are at 7:00 in the Community Room.)

October 22

November 19

December 17

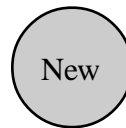
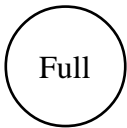


## Thank You Castle Storage

For over a year now, Castle Storage has generously provided EAS a place to store its telescopes and equipment. EAS would like to thank Castle Storage for their generosity and support for our group. Please give them a call if you need a storage space, and tell your friends. They are great people and offer secure and quality storage units.



# Observing in October



October 3	October 11	October 17	October 25
Mercury Rise: 5:41 AM	Mercury Rise: 5:55 AM	Mercury Rise: 6:21 AM	Mercury Rise: 7:02 AM
Venus Rise: 5:03 AM	Venus Rise: 5:23 AM	Venus Rise: 5:38 AM	Venus Rise: 5:59 AM
Mars Rise: 00:27 AM	Mars Rise: 00:16 AM	Mars Rise: 00:08 AM	Mars Rise: 11:55 PM
Jupiter Set: 2:40 AM	Jupiter Set: 2:08 AM	Jupiter Set: 1:44 AM	Jupiter Set: 1:14 AM
Saturn Rise: 6:00 AM	Saturn Rise: 5:34 AM	Saturn Rise: 5:14 AM	Saturn Rise: 4:47 AM
Uranus Set: 5:53 AM	Uranus Set: 5:20 AM	Uranus Set: 4:56 AM	Uranus Set: 4:23 AM
Neptune Set: 3:17 AM	Neptune Set: 2:45 AM	Neptune Set: 2:21 AM	Neptune Set: 1:49 AM
Pluto Set: 11:13 PM	Pluto Set: 10:42 PM	Pluto Set: 10:19 PM	Pluto Set: 9:48 PM

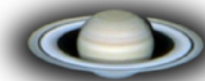
All times: Pacific Standard Time (Nov 2, 2008-March 8, 2009) = UT -8 hours or U.S. Pacific Daylight Time (March 8-November 1, 2009) = UT -7 hours.

Date	Moonrise	Moonset	Sunrise	Sunset	Twilight Begin	Twilight End
10/1/2009	16:34	04:33	07:10	18:53	05:34	20:29
10/2/2009	17:54	05:37	07:12	18:51	05:35	20:27
10/3/2009	18:15	06:43	07:13	18:49	05:37	20:25
10/4/2009	18:38	07:51	07:14	18:47	05:38	20:23
10/5/2009	19:06	09:02	07:15	18:45	05:39	20:21
10/6/2009	19:39	10:14	07:16	18:44	05:40	20:19
10/7/2009	20:21	11:26	07:18	18:42	05:42	20:18
10/8/2009	21:13	12:35	07:19	18:40	05:43	20:16
10/9/2009	22:17	13:36	07:20	18:38	05:44	20:14
10/10/2009	23:28	14:27	07:21	18:37	05:45	20:12
10/11/2009		15:08	07:23	18:35	05:47	20:11
10/12/2009	00:45	15:41	07:24	18:33	05:48	20:09
10/13/2009	02:02	16:10	07:25	18:31	05:49	20:07
10/14/2009	02:19	16:35	07:26	18:30	05:50	20:06
10/15/2009	04:34	16:58	07:27	18:28	05:51	20:04
10/16/2009	05:49	17:22	07:29	18:26	05:53	20:02
10/17/2009	07:03	17:47	07:30	18:25	05:54	20:01
10/18/2009	08:16	18:15	07:31	18:23	05:55	19:59
10/19/2009	09:29	18:48	07:33	18:21	05:56	19:58
10/20/2009	10:37	19:28	07:34	18:20	05:57	19:56
10/21/2009	11:40	20:15	07:35	18:18	05:59	19:55
10/22/2009	12:35	21:08	07:36	18:17	06:00	19:53
10/23/2009	13:20	22:07	07:38	18:15	06:01	19:52
10/24/2009	13:57	23:09	07:39	18:14	06:02	19:50
10/25/2009	14:28		07:40	18:12	06:03	19:49
10/26/2009	14:54	00:12	07:42	18:11	06:05	19:47
10/27/2009	15:16	01:15	07:43	18:09	06:06	19:46
10/28/2009	15:37	02:19	07:44	18:08	06:07	19:45
10/29/2009	15:57	03:22	07:45	18:06	06:08	19:43
10/30/2009	16:17	04:27	07:47	18:05	06:09	19:42
10/31/2009	16:40	05:34	07:48	18:03	06:10	19:41

All times are for Eugene, Oregon, Latitude 44° 3' Longitude 123° 06' for listed date

## Other Items of Interest This Month

- 10/8 near dawn, Saturn within 1/3 degree of Mercury
- 10/9 4:31 AM, LCROSS impacts Lunar S. Pole
- 10/13 near dawn, Saturn within 1/2 degree of Venus
- 10/20 PM - 10/21 AM, Peak of Orionid meteor shower (favorable moon this time)
- 10/23 First Quarter Friday Star Party**
- 10/30 - 11/2 Mars in Beehive Cluster



## For Current Occultation Information

Visit Derek C. Breit's web site

**"BREIT IDEAS Observatory"**

<http://www.poyntsource.com/New/Regions/EAS.htm>

Go to Regional Events and click on the Eugene, Oregon section. This will take you to a current list of Lunar & asteroid events for the Eugene area. Breit continues to update and add to his site weekly if not daily. This is a site to place in your favorites list and visit often.

# Observing Highlight: a Preview of Saturn

Saturn has been hiding behind the Sun for the last couple of months, and won't return to the night sky (at least not at a civilized hour) for several months to come. Fortunately, nature has provided a respectable substitute near the boundary of Aquarius and Capricornus. The Saturn Nebula, also known as NGC 7009, is a planetary nebula, one of a group of objects that got their name because they do indeed resemble planets at low to medium power. The Saturn Nebula lives up to the name better than most because it doesn't just resemble a planetary disk; it fakes a ring system amazingly well.

Many planetary nebulae are bi-lobed, and the Saturn Nebula is an excellent example of one. At low power or in a small telescope it merely looks elongated, but at higher power and with larger apertures the two jets extending off to the sides can clearly be seen. With enough aperture, its bluish green color also becomes apparent.

It was discovered by William Herschel on September 7, 1782 and was one of his earliest discoveries in his sky survey. It was named the Saturn Nebula by Lord Rosse in the 1840s, when telescopes had improved to the point that its Saturn-like shape could be discerned.

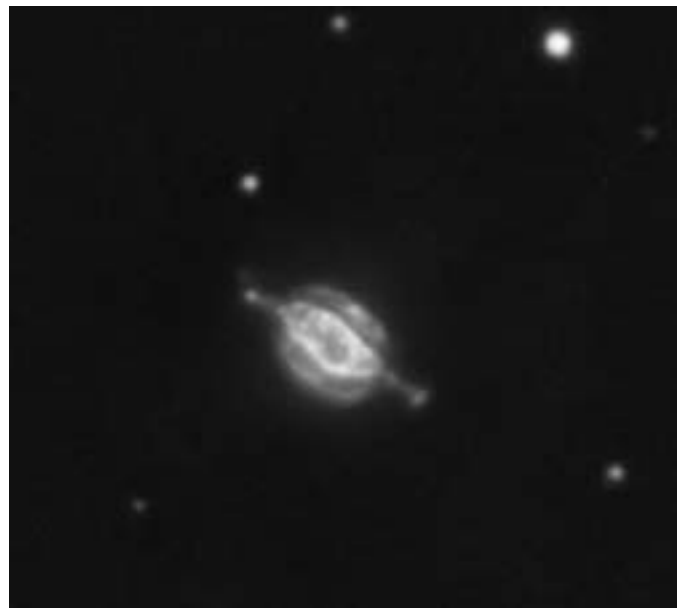
The distance to the Saturn Nebula has not been well determined. Current estimates place it from 2400 to 3600 light years.

How do you find the Saturn Nebula? It sits almost exactly 6 degrees north of theta ( $\theta$ ) Capricornus, the fourth major star from the left horn of the sea goat. There's a narrow triangle of stars in that region comprising the western end of Aquarius on one end and extending to the left and slightly downward to the point of the triangle. The Saturn Nebula is within a degree of the point of that triangle, along the bottom line. It's relatively bright, but not all that big, so look for a bright star that won't quite come to focus, then crank up the power and see the nebula.

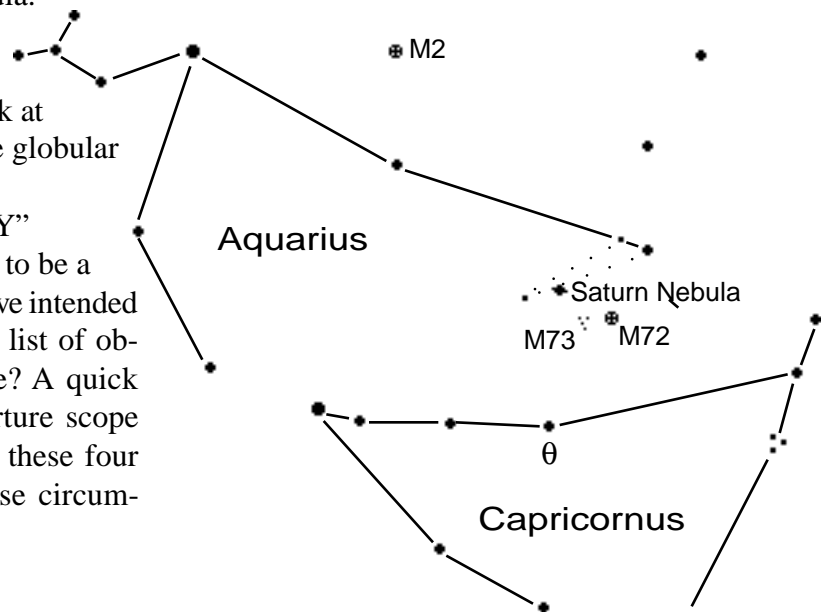
For go-toers, the R.A. is 21:04:11 and the Declination is -11:21:48.

While you're in the area, have a look at M72, a relatively faint but still resolvable globular cluster about 59,000 light-years away.

You can also look for M73, a tiny "Y" asterism of four stars that many consider to be a mistake. Clearly Charles Messier can't have intended to include such a simple asterism in his list of objects easily mistaken for comets, can he? A quick look at low power through a small-aperture scope will show you why it wasn't a mistake: these four stars look surprisingly fuzzy under those circumstances.



Saturn Nebula courtesy NASA



# Observing an Impact on the Moon

One of the dreams of practically anybody who watches the Moon through a telescope is to witness an impact on the surface. On the morning of Friday, October 9th, we'll get our chance. That's when NASA will crash a probe into the south polar region of the Moon, and we stand a fair chance of seeing the flash and/or the plume of dust and (we hope!) ice that it kicks up.

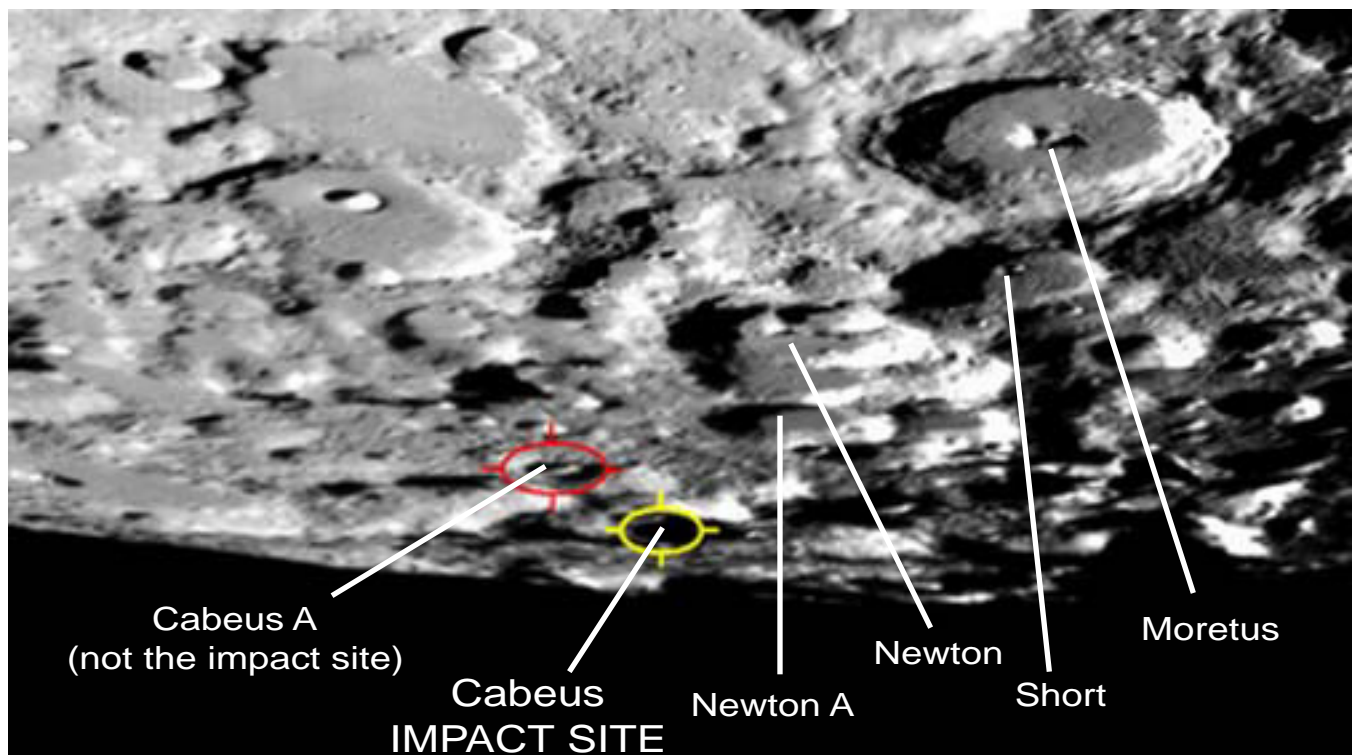
Unfortunately, the impact is scheduled for 4:31:30 in the morning Pacific time. Worse, the Moon will be in its waning gibbous phase, and relatively bright. The impact and the subsequent plume of ejecta will be relatively dim (8th-10th magnitude), so any hope of seeing it lies in using high magnification on the area of impact, putting most of the Moon's lit surface outside the field of view.

The crater chosen for the impact is called Cabeus (not Cabeus A as originally reported). It's just a few degrees to the northeast of Shackleton crater at the Lunar south pole. Fortunately, the gibbous phase will allow us to crater-hop down from Clavius thru Moretus, Short, Newton, and Newton A to Cabeus.

The impactor (the launch vehicle's spent Centaur upper stage) masses 5,081 lb, and is expected to dig a crater 66 feet wide and 13 feet deep, throwing a V-shaped debris cloud upward 10-15 miles. The impact itself will probably be hidden by the crater wall (unless it misses its target), but the debris plume should rise above the crater and be visible for 30-100 seconds. Whether it'll be visible in amateur-sized scopes is anybody's guess. Considering how cool it would be if it is, I expect many of us to gather on College Hill Reservoir to watch. Come join us!



LCROSS on its way to the Moon (NASA)





# Water Molecules Found on the Moon

from Science@NASA.gov

NASA scientists have discovered water molecules in the polar regions of the Moon. Instruments aboard three separate spacecraft revealed water molecules in amounts that are greater than predicted, but still relatively small. Hydroxyl, a molecule consisting of one oxygen atom and one hydrogen atom, also was found in the lunar soil.

The observations were made by NASA's Moon Mineralogy Mapper, or M<sup>3</sup> ("M-cubed"), aboard the Indian Space Research Organization's Chandrayaan-1 spacecraft. NASA's Cassini spacecraft and NASA's Epoxi spacecraft have confirmed the find.

"Water ice on the Moon has been something of a holy grail for lunar scientists for a very long time," said Jim Green, director of the Planetary Science Division at NASA Headquarters in Washington. "This surprising finding has come about through the ingenuity, perseverance and international cooperation between NASA and the India Space Research Organization."

From its perch in lunar orbit, M<sup>3</sup>'s state-of-the-art spectrometer measured light reflecting off the Moon's surface at infrared wavelengths, splitting the spectral colors of the lunar surface into small enough bits to reveal a new level of detail in surface composition. When the M<sup>3</sup> science team analyzed data from the instrument, they found the wavelengths of light being absorbed were consistent with the absorption patterns for water molecules and hydroxyl.

"When we say 'water on the Moon,' we are not talking about lakes, oceans or even puddles," explained Carle Pieters, M<sup>3</sup>'s principal investigator from Brown University, Providence, R.I. "Water on the Moon means molecules of water and hydroxyl that interact with molecules of rock and dust specifically in the top millimeters of the Moon's surface."

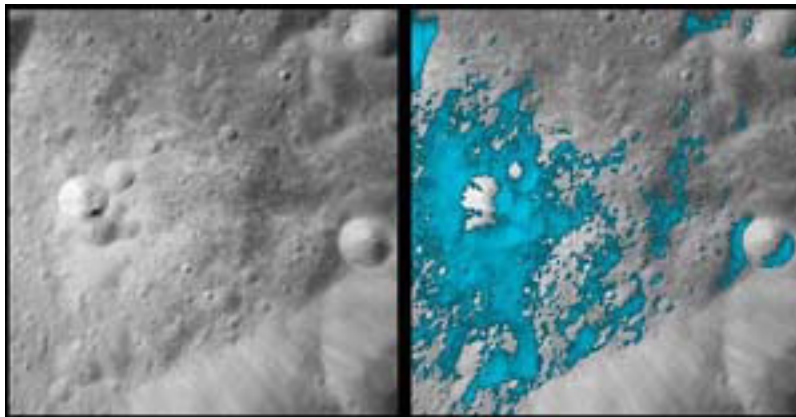
The M<sup>3</sup> team found water molecules and hydroxyl at diverse areas of the sunlit region of the Moon's surface, but the water signature appeared stronger at the Moon's higher latitudes. Water molecules and hydroxyl previously were suspected in data from a Cassini flyby of the Moon in 1999, but the findings were not published until now.

"The data from Cassini's VIMS instrument and M<sup>3</sup> closely agree," said Roger Clark, a U.S. Geological Survey scientist in Denver and member of both the VIMS and M<sup>3</sup> teams. "We see both water and hydroxyl. While the abundances are not precisely known, as much as 1,000 water molecule parts-per-million could be in the lunar soil. To put that into perspective, if you harvested one ton of the top layer of the Moon's surface, you could get as much as 32 ounces of water."

For additional confirmation, scientists turned to the Epoxi mission while it was flying past the Moon in June 2009 on its way to a November 2010 encounter with comet Hartley 2. The spacecraft not only confirmed the VIMS and M<sup>3</sup> findings, but also expanded on them.

Jessica Sunshine, Epoxi's deputy principal investigator and a scientist on the M<sup>3</sup> team says, "Our analysis unequivocally confirms the presence of these molecules on the Moon's surface and reveals that the entire surface appears to be hydrated during at least some portion of the lunar day."

The discovery of water molecules and hydroxyl on the Moon raises new questions about the origin of "Moon water" and its effect on lunar mineralogy.



The distribution of water-rich minerals shown in false-color blue

# Meteorite Impacts Expose Ice on Mars

from Science@NASA.gov

Meteorites recently striking Mars have exposed deposits of frozen water not far below the Martian surface. Pictures of the impact sites taken by NASA's Mars Reconnaissance Orbiter show that frozen water may be available to explorers of the Red Planet at lower latitudes than previously thought.

“This ice is a relic of a more humid climate from perhaps just several thousand years ago,” says Shane Byrne of the University of Arizona, Tucson. “We now know we can use new impact sites as places to look for ice in the shallow subsurface.”

So far, the HiRISE camera team has found bright ice exposed at five Martian sites with new craters that range in depth from approximately half a meter to 2.5 meters (1.5 feet to 8 feet). The craters did not exist in earlier images of the same sites. Bright patches darkened in the weeks following initial observations, as freshly exposed ice vaporized into the thin Martian atmosphere.

(Yes, this is apparently the “follow the water” issue.)

## Frank Casebolt's Eagle and Lagoon Nebulae

This summer Frank Casebolt made it out to some dark sky and did some imaging. Here and on the next page are two of his photos. Both were taken through an Orion ED80. As Frank says, “Not bad for a three inch scope, and it's not even an APO.” Each image is about 3-hours of exposure time thru H-Alpha, Red, Green, and Blue filters.



The Eagle Nebula, © 2009 by Frank Casebolt



The Lagoon Nebula, © 2009 by Frank Casebolt

## Dues are Due!

EAS membership runs from October 1 thru September 30. That means it's time to pay your club dues if you didn't already pay them at our September 24th meeting. The October 22nd meeting will be soon enough, but if you can't make it to that meeting, please mail your dues to the Eugene Astronomical Society, PO Box 7264, Eugene, OR 97401. Dues are \$25. Make your checks payable to Eugene Astronomical Society, or just EAS if your pen is low on ink.

## Pine Mountain Closed for the Season

Due to the impending arrival of winter weather, Mark Dunaway, Observatory Manager, has decided that Pine Mountain Observatory is now closed effective immediately (September 29th), for the 2009 season. The Observatory will reopen in the Spring as weather and road conditions allow. Friends of Pine Mountain Observatory, the organization that runs the summer public viewing program, will put out the word as soon as they know when that will be.